UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/709,758	11/10/2000	Oleg Y. Abramov	031356.0009.UTL1	4756

1054 7590 06/17/2005

LEONARD TACHNER, A PROFESSIONAL LAW CORPORATION
17961 SKY PARK CIRCLE, SUITE 38-E
IRVINE, CA 92614

EXAMINER	
JACKSON, BLANE J	

ART UNIT	PAPER NUMBER
2685	

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/709,758	ABRAMOV ET AL.	
	Examiner	Art Unit	
	Blane J Jackson	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 March 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *42-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *42-81* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 November 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because of the informal legends in all figures and the informal flow diagrams of figures 9 and 10. The requirement for corrected drawings will not be held in abeyance.

Claim Objections

2. Claims 61 and 74 are objected to because of the following informalities: In view of previous claim 73 and independent claim 67, these claims confuse scanning and apparent reception with phase shifting the antenna elements for transmission. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 42-46, 48, 49, 51, 52, 56-64, 66, 67, 69-76, 78-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson (US 6,487,423) with a view to Reudink et al. (US 6,363,263).

As to claims 42-44 and 49, Johansson teaches a direction agile antenna system for use in establishing and maintaining wireless data links, the system comprising:

An *antenna signal* capable of being selectively oriented to transmit or receive an electromagnetic signal in a plurality of selected directions (figures 4a, 4b, beam steering based on signal to/from antenna elements (401a-401d), column 5, lines 35-48),

A controller coupled to the antenna and configured to transmit at lest one polling request through the antenna, detect responses to the polling request determine a selected direction for the orientation of the antenna based on the responses to the polling request and transmit a direction control signal to the antenna indicating the selected direction for the antenna (figure 5, signaling diagram for a connection set-up procedure between a BSC plus radio node (502) and radio terminal that starts with a polling request or connection request (505) from the BSC, column 6, lines 43-65).

Johansson teaches that the antenna signal is capable of being oriented an electromagnetic signal through beam forming functions, column 5, line 56 to column 6, line 18) but does not indicate that the antenna (itself) is capable of being selectively oriented.

Reudink teaches a cellular base station that implements a multiple narrow beam antenna system where the antenna structure (310) includes antennas (311) through (313) where each is associated with a different narrow beam. Reudink further teaches the BTS equipment includes a scan receiver (340) and associated switch array and controller (390) to scan and select the desired antenna beam signal supplied to a particular radio, figure 3, column 7, lines 43-65.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alternatively exchange the beam steered antenna array of Johansson for the switched beam system of Reudink for best RSSI, C/N ratio and to minimize interference with another signal.

As to claim 45 with respect to claim 42, Johansson teaches the system of claim 42 wherein the antenna comprises a plurality of elements and the controller is further configured to transmit the polling requests from all of the elements (column 6, lines 46-49, the BSC broadcasts an identification number without beamforming).

As to claim 46, Johansson teaches the system of claim 42 where the controller comprises a transceiver (figure 4b, BSC plus radio node comprising several transceivers/ channels).

As to claim 48, Reudink of Johansson modified teaches the system of claim 42 wherein the controller is further configured to scan the antenna in multiple directions and detect a response to the polling request during the scanning of the antenna (the controller operates from information regarding signal attributes as determined by the scan receiver (340), column 7, lines 59-65).

As to claim 49 with respect to claim 43, Johansson teaches the system of claim 43 wherein at least some of the elements are arranged as a phased array (beamforming: column 5, line 56 to column 6, line 18).

As to claims 51 and 66, Johansson teaches a method of improving a wireless communication link using a direction agile antenna, the method comprising:

Transmitting at least one request form the direction agile antenna (figure 2, BSC plus radio node (502) transmits a connection request (505)),

Electronically steering the antenna beam of the direction agile antenna in multiple directions (beamforming functions of the signals received by antenna elements (401a-401d), column 5, lines 35-58),

Detecting responses to the request,

Determining a direction of the antenna beam of the direction agile antenna based on the detected responses and

Transmitting or receiving a signal from the direction agile antenna in the determined direction (figure 5, connection set-up procedure between the BSC (501)/ terminal node (502) and the radio terminal (503), column 6, lines 43-65).

Johansson teaches receiving the response to determine where to electronically steer the antenna array but does not teach scanning the antenna beam of the direction agile antenna.

Reudink teaches a cellular base station that implements a multiple narrow beam antenna system where the antenna structure (310) includes antennas (311) through

(313) where each is associated with a different narrow beam. Reudink further teaches the BTS equipment includes a scan receiver (340) and associated switch array and controller (390) *to scan and select the desired antenna beam signal* supplied to a particular radio, figure 3, column 7, lines 43-65.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alternatively exchange the beam steered antenna array of Johansson for the switched beam system of Reudink for best RSSI, C/N ratio and to minimize interference with another signal.

As to claim 52 with respect to claim 51, Johansson teaches the direction agile antenna comprises a plurality of elements and said at least one request is transmitted from all of the antenna elements of the direction agile antenna (plurality of elements, column 5, lines 41-43, request to the radio terminal is broadcast by the BSC/radio node without beamforming, column 6, lines 45-49).

As to claim 56 with respect to claim 51, Johansson teaches wherein the determined a direction of the antenna beam of the direction-agile antenna comprises detecting a beam pattern of a signal carrying a response to the request over the scanning of the direction-agile antenna (radio terminal (503) responds followed by transmission from the BSC/radio node with active directional beam: column 6, lines 49-59).

As to claim 57 with respect to claim 51, Reudink of Johansson modified teaches determining the direction of the antenna beam of the direction-agile antenna comprises comparing one or more characteristics of a signal carrying a response to the request detected at different times during the scanning (column 7, lines 59 to column 8, line 7).

As to claims 58 and 59 with respect to claim 51 and claims 71 and 72 with respect to claim 67, Johansson teaches monitoring characteristics of a signal received by the direction-agile antenna, determining if the characteristics meet predetermined criteria and if the predetermined criteria are met, scanning the antenna beam of the direction-agile antenna in multiple directions (signal samples are continuously monitored to determine the directions of arrivals of signals from both desired and interfering signal sources such that a control unit decides which signals are desired based on best a quality factor, column 5, lines 59-67). Note that Johansson primarily teaches the method of operation by electronically steering a phased array and Reudink teaches the scanning with selection of physical antenna (beams)).

As to claims 61 and 74, Johansson teaches an antenna has a plurality of antenna elements and *beamforming* the gain of the direction-agile antenna in multiple directions comprises shifting the phases of signals transmitted by different antenna elements of the direction-agile antenna.

As to claim 62 with respect to claim 61, Johansson teaches wherein transmitting at least one request from the direction-agile antenna comprises transmitting a request form all of the antenna elements (plurality of elements, column 5, lines 41-43, request to the radio terminal is broadcast by the BSC/radio node without beamforming, column 6, lines 45-49).

As to claims 63 and 75 with respect to claims 51 and 67, Reudink of Johansson modified teaches recording the determined direction for later use (column 10, lines 45-54).

As to claim 64 with respect to claim 51, Reudink of Johansson teaches the request is a polling request and the responses are transmitted according to the IEEE 802.11 standard (method applicable on any wireless communication system: column 6, lines 5-12).

As to claims 67, 76 and 78, Johansson teaches a direction-agile antenna system and method for use in establishing and maintaining wireless data links comprising:

Receiving at the direction-agile antenna in multiple directions,

Beam forming the direction-agile antenna in multiple directions,

Determining a direction for the gain of the direction-agile antenna based on the received requests (receiving, direction determination and beamforming, figures 1, 2 and 4a, column 5, line 35 to column 6, line 18), and

Transmitting or receiving a signal at the direction-agile antenna in the determined direction (reciprocity of antenna direction for transmit/receiver, column 6, lines 23-42).

Johansson teaches a method of determining the direction of the received signal and beamforming the antenna array for subsequent messaging where this method applies to BSC/ radio node or radio terminal initiated transmissions. Johansson clearly teaches a signaling diagram in connection set-up procedure that is BSC/radio node initiated, as claimed in claim 1. However, Johansson does not teach scanning the antenna beam of the direction agile antenna.

Reudink teaches a cellular base station that implements a multiple narrow beam antenna system where the antenna structure (310) includes antennas (311) through (313) where each is associated with a different narrow beam. Reudink further teaches the BTS equipment includes a scan receiver (340) and associated switch array and controller (390) *to scan and select the desired antenna beam signal* supplied to a particular radio, figure 3, column 7, lines 43-65.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alternatively exchange the beam steered antenna array of Johansson for the switched beam system of Reudink for best RSSI, C/N ratio and to minimize interference with another signal.

As to claim 69 with respect to claim 67, Johansson teaches wherein determining the direction for the gain of the direction-agile antenna comprises detecting a beam

pattern of the signal carrying the requests from a device requesting a data link (column 5, lines 59-67).

As to claim 70 with respect to claim 67, Reudink of Johansson modified teaches determining a direction for the gain of the direction-agile antenna comprises comparing characteristics of the signal carrying the requests from a device requesting a data link detected at different times during the scanning (column 7, lines 59 to column 8, line 7).

As to claim 73 with respect to claim 67, and 81 with respect to claim 79, Reudink of Johansson modified teaches the antenna has a plurality of antenna elements and scanning the gain of the direction-agile antenna in multiple directions comprises activating and switching off different antenna elements of the direction-agile antenna (switching of the switching arrays to couple a desired antenna beam signal to a particular radio is controlled by controller (390), column 7, lines 43-65).

As to claim 79, Johansson teaches a direction-agile antenna system for use in establishing and maintaining wireless data links, the system comprising:

An antenna capable of selectively transmitting or receiving an electromagnetic signal in a plurality of directions (figures 1-4a, adaptive antenna, column 3, line 60 to column 4, line 66),

A controller coupled to the antenna and configured to (covariance block (406):

Receive via the antenna signals from a device requesting a data link,

Send a signal to the antenna to cause it to orient its gain in multiple directions,

Determine a selected direction for the orientation of the gain of the antenna based on the requests received while *beamforming the received antenna signal*, and

Transmit a direction control signal to the antenna indicating the selected direction for the orientation of the gain of the antenna (BSC/radio node receives signal from a terminal radio, determines the direction for subsequent transmit/reception, column 5, line 35 to column 6, line 42).

Johansson teaches a method of determining the direction of the received signal and beamforming the antenna array for subsequent messaging where this method applies to BSC/ radio node or radio terminal initiated transmissions. Johansson clearly teaches a signaling diagram in connection set-up procedure that is BSC/radio node initiated, as claimed in claim 1. However, Johansson does not teach scanning the antenna beam of the direction agile antenna.

Reudink teaches a cellular base station that implements a multiple narrow beam antenna system where the antenna structure (310) includes antennas (311) through (313) where each is associated with a different narrow beam. Reudink further teaches the BTS equipment includes a scan receiver (340) and associated switch array and controller (390) *to scan and select the desired antenna beam signal* supplied to a particular radio, figure 3, column 7, lines 43-65.

It would have been obvious to one of ordinary skill in the art at the time of the invention to alternatively exchange the beam steered antenna array of Johansson for

the switched beam system of Reudink for best RSSI, C/N ratio and to minimize interference with another signal.

As to claim 80 with respect to claim 79, Reudink of Johansson modified teaches the antenna comprises a plurality of elements and at least one of the plurality of elements is configured to transmit an electromagnetic signal in a different direction than another of the elements (a smart antenna of antennas (311-313) each associated with a different narrow beam, column 7, lines 30-49).

5. Claims 53-55 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson (US 6,487,423) and Reudink et al. (US 6,363,263) and further in view of Lee (US 6,198,925).

As to claims 53-55 with respect to claim 51 and 68 with respect to claim 67, Johansson modified teaches a system that scans physically distinct antenna and antenna patterns but does not teach the step of selecting the scanning speed, scanning angle increments or scanning in azimuth and elevation (angles).

Lee teaches a controller coupled to an antenna array, scanner and serving transceiver where the scanner selectably scans communication channels by using the antenna serving the zone, from other zones, more than one zone or in combination with beam forming techniques such as those employed with phased array antenna, figure 2, column 4, lines 11-29).

It would have been obvious to one of ordinary skill in the art at the time of the invention to identify in the antenna signal scanning of Johansson modified the alternatives introduced by Lee in terms of scan type and direction to determine the best signal and associated antenna beam to/from the terminal radio.

6. Claims 47, 50, 65 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson (US 6,487,423) and Reudink et al. (US 6,363,263) and further in view of Gietema (US 6,222,503).

As to claim 47 with respect to claim 42 and claim 77 with respect to claim 76, Johansson does not teach the controller comprises circuitry which is integrated with a surface on which at least one of the elements is disposed.

Gietema teaches an antenna and associated antenna components are arranged in a pole like or panel object where the antenna is mounted inside the tube or panel in an array configuration and the antenna components may comprise a pico-cell base station in a cellular telephone network, column 4, lines 28-60. Gietema further teaches the antenna elements (and supporting components) provide spatially steered or switched beam phased array, column 10, lines 3-17.

It would have been obvious to one of ordinary skill in the art at the time of the invention would combine the antenna array and controller circuits of Johansson in the describe packaging of Gietema to support concealing a base station radio frequency antenna and associated antenna components.

As to claim 50 with respect to claim 42 and 65 with respect to claim 51, Reudink of Johansson modified teaches the antenna comprises a plurality of elements that can be separately activated, figure 3, but does not teach the elements comprise at least one reflector.

Gietema teaches an antenna phased array to be spatially steered or switched beam, column 10, lines 3-17, where the antenna elements may be fabricated using printed circuit techniques for an integrated patch or other microstrip based antenna elements with inherent reflector, column 14, lines 26-50.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Proctor, Jr. et al. (US 2001/0031648) discloses an adaptive antenna applied to a cellular communication system with phase shifters that are adjusted incrementally in a fine and coarse scan modes. Miyahara (US 6,449,469) discloses a switched directional antenna for automotive radio receivers. Reudink et al. (US 6,621,454) discloses adaptive beam pattern antennas and method for interference mitigation in point to multipoint RF data transmissions. Lee (US 6,748,216) discloses a method for controlling wireless communications comprising a scanner coupled to a multi beam antenna, controller and serving transceiver.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blane J Jackson whose telephone number is (571) 272-

7890. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJJ

EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600